



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,780	04/19/2005	Thomas Schafer	EL/2-22773/A/PCT	6057

324 7590 06/01/2009

JoAnn Villamizar  
Ciba Corporation/Patent Department  
540 White Plains Road  
P.O. Box 2005  
Tarrytown, NY 10591

EXAMINER
----------

YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
----------	--------------

1794

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

06/01/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

andrea.dececchis@ciba.com  
deborah.pinori@ciba.com  
sonny.nkansa@basf.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/531,780	<b>Applicant(s)</b> SCHAFFER ET AL.	
	<b>Examiner</b> Marie R. Yamnitzky	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 26-45 is/are pending in the application.
- 4a) Of the above claim(s) 35, 36, 44 and 45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-34 and 37-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

Art Unit: 1794

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 09, 2009 (amendment and Rule 132 Declaration) has been entered.

2. Applicant's amendment filed March 09, 2009 cancels all previously pending claims, thus rendering moot the rejections as set forth in the Office action mailed September 29, 2008, and adds claims 26-45.

The claims remain subject to an election of species due to lack of unity. New claims 26-34 and 37-43 read on the elected species.

Claims 35, 36, 44 and 45 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 24, 2008.

Although this Office action applies prior art against some non-elected species, this action does not represent an examination on the merits of all species within the scope of the examined claims.

3. The disclosure is objected to because of the following informalities:

The specification contains many areas of text and formulae that are not clearly readable, particularly near the bottom left of some pages. For example, see the first formula in line 14 on page 2 (unclear mark at the bottom of the ring), see page 4, line 21, and see similar location on pages 10, 16, 20, 22, 28, 32, 34, 38, 40, 50, 52, 56, 58 and 70.

Appropriate correction is required.

4. Claim 33 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

The biphenyl group represented by the last formula in claim 33 for  $R^{110}$  is not within the scope of  $R^{110}$  as defined in claim 32, from which claim 33 depends.

5. Claims 26-29, 32-34, 37-39 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of alkyl-substituted aryl groups within the scope of  $R^8$  as defined in independent claims 26 and 37 is not clear. The definition of  $R^8$  first recites “C<sub>7</sub>-C<sub>12</sub>alkylaryl”, and later recites “C<sub>6</sub>-C<sub>18</sub>aryl which is substituted by C<sub>1</sub>-C<sub>18</sub>alkyl”. The latter recitation

encompasses a much larger set of alkylaryl groups than encompassed by the first recitation, and it is not clear to which set the claims are limited.

The definition of W, Y and X in claims 27 and 38 as “independently of each other C<sub>6</sub>-C<sub>30</sub>aryl or C<sub>2</sub>-C<sub>30</sub>heteroaryl, which can be substituted or unsubstituted” is inconsistent with the proviso set forth in claims 26 and 37, which requires that at least two of these groups “are C<sub>6</sub>-C<sub>24</sub>aryl or C<sub>2</sub>-C<sub>24</sub>heteroaryl, which can be substituted or unsubstituted”.

Further claims 27 and 38 set forth a broad range for the aryl group which W, Y and X may be, together with a narrow range for the aryl group (or at least for a substituted aryl group). A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by “such as” and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claims 27 and 38 recite the broad range of C<sub>6</sub>-C<sub>30</sub>aryl which can be substituted or unsubstituted, and these claims also set forth a narrower set of aryl groups represented by the three formulae set forth beginning at the 9<sup>th</sup> line of claims 27 and 38.

Art Unit: 1794

Since each of the five W, Y and X variables in the three formulae may be H, it is also not clear if unsubstituted aryl groups for W, Y and X as defined in claims 27 and 38 are limited to unsubstituted phenyl, or if these formulae only apply to substituted aryl groups for W, Y and X.

The last line on pages 3 and 11 of the amendment filed March 09, 2009 includes “H, C<sub>2</sub>-C<sub>18</sub>alkynyl;”. It is not clear if these are possibilities for Ar<sup>2</sup>, or for Ar<sup>1</sup> and Ar<sup>2</sup>, or for something else.

Claims 32 and 42 include the abbreviation “Ph”, which is not defined in these claims, or in the claims from which these claims depend.

The scope of R<sup>110</sup> per claim 32 is unclear in light of claim 33, which shows a biphenyl group for R<sup>110</sup>. A biphenyl group is not within the scope of R<sup>110</sup> as defined in the last two lines of claim 32.

The preamble of claim 34 is inconsistent with the preamble of claim 26, which is directed to an electroluminescent device. If claim 34 is only directed to a pyrimidine compound, then claim 34 is not a proper dependent claim because it does not further limit the device of claim 26. (If claim 34 is only directed to a pyrimidine compound, claim 34 is also a substantial duplicate of claim 43.)

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 26, 27, 37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Ise et al. (US 2002/0028329 A1).

The compound represented by formula A-13 on page 15 is a pyrimidine compound of present formula (I) as shown in claims 26 and 37 wherein V is hydrogen, and each of W, X and Y is C<sub>2</sub>-C<sub>24</sub> heteroaryl group that is substituted. This prior art compound meets the limitations of the pyrimidine compound required for the device of claims 26 and 27, and is disclosed for use in an organic compound layer of an electroluminescent device comprising one or more organic compound layers sandwiched between an anode and a cathode, and meets the limitations of the pyrimidine compound of claims 37 and 38.

8. Claims 26 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakon et al. (US 5,077,142).

The compound represented by formula 146 in columns 67-68 is a pyrimidine compound of present formula (I) as shown in claims 26 and 37 wherein each of V, W, X and Y is a C<sub>6</sub> aryl group that is unsubstituted. This prior art compound meets the limitations of the pyrimidine compound required for the device of claim 26, and is disclosed for use in an organic compound layer of an electroluminescent device comprising one or more organic compound layers sandwiched between an anode and a cathode, and meets the limitations of the pyrimidine compound of claim 37. The compound of this formula is also set forth as part of a Markush group for the electroluminescent device of patent claim 5.

9. Claims 26 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Uchida et al. (EP 0 926 216 A1).

The compound synthesized per Synthesis Example 4 (page 11) is a pyrimidine compound of present formula (I) as shown in claims 26 and 37 wherein X, and one of W and Y, is a C<sub>6</sub> aryl group that is substituted, and wherein V, and the other of W and Y, is hydrogen. This prior art compound meets the limitations of the pyrimidine compound required for the device of claim 26, and is disclosed for use in an organic compound layer of an electroluminescent device comprising one or more organic compound layers sandwiched between an anode and a cathode, and meets the limitations of the pyrimidine compound of claim 37.

10. Claims 37-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Bajic et al. in *Molecules*, Vol. 6, p. 477-480 (2001).

Bajic et al. disclose 2,4,6-Tris-(4-bromophenyl)pyrimidine (compound **3** per Scheme 1 on page 478), which is a compound within the scope of present claims 37-39. This prior art compound is a compound as defined in claim 39 (which further limits claim 38, which further limits claim 37) wherein each of W<sup>3</sup>, X<sup>3</sup> and Y<sup>3</sup> is halogen and the other positions on W, X and Y are hydrogen.

11. Claims 37-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Schomaker et al. in *J. Org. Chem.*, Vol. 66, pp. 7125-7128 (2001).



The compound of formula **4** as shown in Scheme 1 on page 7125 is a compound within the scope of present claims 37 and 38, wherein V is a C<sub>2</sub> alkyl group and each of W, X and Y is an unsubstituted C<sub>6</sub> aryl group.

The compound of formula **12** as shown in Scheme 3 on page 7126 is a compound within the scope of present claims 37-39, wherein V is hydrogen and each of W, X and Y is an unsubstituted C<sub>6</sub> aryl group (i.e. each of the positions on W, X and Y as shown in claim 39 is hydrogen).

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 26-29 and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakon et al. (US 5,077,142) in view of Schomaker et al. in *J. Org. Chem.*, Vol. 66, pp. 7125-7128 (2001).

Sakon et al. disclose compounds of the general formula (B')<sub>m</sub>-(Ar)<sub>n</sub> for use in an organic compound layer of an electroluminescent device comprising one or more organic compound layers sandwiched between an anode and a cathode. B' may be pyrimidine and Ar may be benzene, biphenyl, methoxybenzene or naphthalene. See, for example, column 2, line 21-c. 6, l. 45. Pyrimidine compounds having three or four aryl group substituents as within the scope of

Art Unit: 1794

formula (I) as defined in present independent claims 26-37 are within the scope of Sakon's general formula. Sakon et al. provide a specific example of a pyrimidine compound having four phenyl groups as substituents (see the compound represented by formula 146 in columns 67-68), which is within the scope of formula (I) per present claims 26 and 37. Other pyrimidine compounds within the scope of formula (I) per present claims 26 and 37 having four aryl group substituents would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention given Sakon's compound of formula 146 and Sakon's definition of Ar. Sakon's compound of formula 146 is a compound of Sakon's general formula wherein B' is pyrimidine, Ar is benzene, m is 1 and n is 4. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make similar compounds wherein Ar is biphenyl, methoxybenzene or naphthalene.

Pyrimidine compounds within the scope of formula (I) per present claims 26-29 and 37-39 having three aryl group substituents also would have been obvious to one of ordinary skill in the art at the time of the invention given Sakon's definitions of B', Ar, m and n, Sakon's compound of formula 146 and Sakon's compounds such as those of formulae 9 and 10 in columns 15-16 and formula 148 in columns 67-68. Sakon's compound of formula 10 is a compound in which B' is a benzene ring, m is 1, n is 4, and the four Ar groups are in the same pattern on the benzene ring as on the pyrimidine ring in the compound of formula 146. Sakon's compound of formula 9 is a compound in which B' is a benzene ring, m is 1, n is 3, and the three Ar groups are in the same pattern as provided by W, X and Y in present formula (I). Sakon's compound of formula 148 is a compound in which B' is a triazine ring, m is 1, n is 3, and the

Art Unit: 1794

three Ar groups are in the same pattern as provided by W, X and Y in present formula (I). It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to make pyrimidine compounds of Sakon's general formula in which B' is pyrimidine, m is 1, and n is 3. There are only three possible substitution patterns for such a substituted pyrimidine, and one of ordinary skill in the art at the time of the invention would have reasonably expected that a 2,4,6-Ar-substituted pyrimidine would be light-emissive and could be used for Sakon's purposes. Further, one of ordinary skill in the art at the time of the present invention, having knowledge of Sakon's disclosure, and having knowledge of the teachings of Schomaker et al. regarding methods of providing 2,4,6-aryl-substituted pyrimidines, would have been able to make 2,4,6-Ar-substituted pyrimidines within Sakon's general formula. 2,4,6-Ar-substituted pyrimidines within the scope of Sakon's general formula wherein Ar is any of the four possibilities recited at c. 2, l. 63-64 are within the scope of present formula (I) as defined in claims 26 and 37. Such compounds wherein Ar is benzene, biphenyl or methoxybenzene also meet the further limitations set forth in claims 27-29, 38 and 39.

14. Claims 26-34 and 37-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakon et al. (US 5,077,142) in view of Schomaker et al. in *J. Org. Chem.*, Vol. 66, pp. 7125-7128 (2001), as applied to claims 26-29 and 37-39 above, and further in view of Fink et al. (US 6,352,791 B1).

Sakon et al. suggest pyrimidine compounds substituted with three phenyl groups wherein the phenyl group may be unsubstituted (when Ar is benzene) or substituted with an alkoxy group

Art Unit: 1794

(when Ar is methoxybenzene) or substituted with a phenyl group (when Ar is biphenyl).

Schomaker et al. describe a method by which aryl groups may be substituted on a pyrimidine ring at the 2, 4 and 6 positions.

Sakon et al. do not teach a terphenyl group for Ar as necessary to provide substituted pyrimidine compounds per applicant's elected species and within the scope of present claims 26-34 and 37-43 (e.g. as when V is hydrogen and each of W, X and Y is group of the formula set forth in present claims 30 and 40). The closest compound within the scope of Sakon's general formula is a compound wherein B' is pyrimidine, m is 1, n is 3, Ar is biphenyl, and the Ar groups are at positions 2, 4 and 6 of the pyrimidine ring.

Fink et al. disclose compounds for use in an electroluminescent device wherein the compounds have a triazine ring substituted with aromatic substituents. Fink's compounds of formula (I) as shown in column 2 encompass compounds of Sakon's general formula wherein B' is triazine, m is 1, n is 3 and Ar is phenyl (benzene) or biphenyl (see the first and fifth formulae set forth for the R variables in col. 2 of the Fink patent). Fink et al. also teach that the three aromatic substituents on the triazine ring may be terphenyl groups (see the fourth formula set forth for the R variables in col. 2 of the Fink patent). Given Sakon's disclosure of aryl-substituted triazine and pyrimidine compounds for use in an electroluminescent device, and given Fink's disclosure of phenyl, biphenyl or terphenyl as suitable substituents to provide aryl-substituted triazine compounds for use in an electroluminescent device, it would have been an obvious modification to one of ordinary skill in the art at the time of the invention to make compounds similar to those of Sakon's general formula having pyrimidine for B', m is 1, n is 3,

Art Unit: 1794

but having terphenyl, instead of phenyl (benzene) or biphenyl, for Ar. One of ordinary skill in the art would have reasonably expected that terphenyl-substituted compounds could be used for the same purpose as phenyl- or biphenyl-substituted compounds. Further, one of ordinary skill in the art at the time of the invention would have recognized that Schomaker's method could be modified to provide terphenyl groups, instead of phenyl groups, at the 2, 4 and 6 positions of pyrimidine.

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 26-34 and 37-43 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14 of copending

Application No. 11/587,691. Although the conflicting claims are not identical, they are not patentably distinct from each other. Compounds having the formula shown in copending claim 1 wherein A is CH are compounds according to present formula (I) wherein V is hydrogen. While the claims are not identical, there is substantial overlap between the pyrimidine compound of the present claims and electroluminescent device comprising the same, and pyrimidine compounds within the scope of the copending claims and electroluminescent device comprising the same.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented. (The present application is the earlier filed of the two applications. If the provisional rejection becomes the sole rejection in the present application, the rejection will be reconsidered in accordance with MPEP 804 I.B.1.)

17. The data set forth in the Rule 132 Declaration filed March 09, 2009 and applicant's accompanying arguments have been fully considered when making the rejections under 35 U.S.C. 103(a) that are set forth in this action.

The examiner notes that while the data demonstrate that certain aryl-substituted pyrimidine compounds provide unexpectedly superior results when used in a particular multilayered electroluminescent device structure, none of the present claims are limited to a device having the combination of materials and layer arrangement set forth in the declaration. The present device claims merely require at least one organic compound layer comprising a pyrimidine compound between a pair of electrodes. The data do not demonstrate unexpectedly superior results commensurate in scope with the claims.

Art Unit: 1794

18. Miscellaneous:

It appears that a comma should be inserted after “>CR<sup>118</sup>CR<sup>119</sup>” in claims 30 and 40 in the line beginning “group L<sup>1</sup>”.

19. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday and Wednesday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/  
Primary Examiner, Art Unit 1794

MRY  
May 24, 2009